PUBLIC SERVICE COMMISSION
STATE OF MONTANA

Bill Gallagher, Chairman
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Roger Koopman, Commissioner

1701 Prospect Avenue
PO Box 202601
Helena, MT 59620-2601
Voice: 406.444.6199
Fax #: 406.444.7618
http://psc.mt.gov
E-Mail: psc_webmaster@mt.gov

April 11, 2014

Charles Magraw
501 8th Avenue
Helena, MT 59601

RE: Data requests in Docket D2013.12.85

Dear Mr. Magraw,

Enclosed please find data requests of the Montana Public Service Commission to the Human Resource Council, District XI; and the Natural Resources Defense Council. The data requests are numbered PSC-237 through PSC-268 in the above-referenced Docket. Please begin the response to each numbered data request on a new page. Please provide responses by April 25, 2014. If you have questions, please contact me at (406) 444-6191.

Sincerely,

Neil Templeton
Regulatory Division
Montana Public Service Commission

Service Date: April 11, 2014

DEPARTMENT OF PUBLIC SERVICE REGULATION
BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MONTANA

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IN THE MATTER OF NorthWestern Energy's Application for Approval to Purchase and Operate PPL Montana's Hydroelectric Facilities, for Approval of Inclusion of Generation Asset Cost of Service in Electricity Supply Rates, for Approval of Issuance of Securities to Complete the Purchase, and for Related Relief	))))	REGULATORY DIVISION DOCKET NO. D2013.12.85

DATA REQUESTS PSC-237 THROUGH PSC-268 OF THE MONTANA PUBLIC SERVICE COMMISSION TO THE HUMAN RESOURCE COUNCIL, DISTRICT XI; AND THE NATURAL RESOURCES DEFENSE COUNCIL

PSC-237

Regarding: Electronic Files and Supporting Information
Witness: Power

a. Please provide working electronic copies, with all links intact, of all spreadsheets and other analytic files used to support your testimony and associated charts.

b. If not already provided, please provide full citations to all the sources used for the charts appearing in your testimony (or refer to and provide a third-party source that contains full citations).

PSC-238

Regarding: Principal-Agent Problem and Moral Hazard
Witness: Power

a. Please describe the principal-agent problem and moral hazard.

b. Can the principal-agent problem and moral hazard be used to describe relations between a regulated utility and its customers?

c. Can the principal-agent problem and moral hazard be used to describe relations between a regulatory commission and the public?

PSC-239

Regarding: Principal-Agent Problem and Moral Hazard
Witness: Power

For the following questions assume a principal-agent relation with NorthWestern as agent and its customer base as principal.

a. Do the principal and agent possess the same information, or is their information asymmetric?

b. Is the agent in a position to act to increase its own welfare at the expense of the principal?

c. Is the agent's action exposed to moral hazard? Please explain why or why not.

d. If your answer to part (c) is "yes," what actions may the Commission take to reduce the moral hazard?

PSC-240

Regarding: Principal-Agent Problem and Moral Hazard
Witness: Power

For the following questions assume a principal-agent relation with the Commission as agent and the Montana public as principal.

a. Do the principal and agent possess the same information, or is their information asymmetric?

b. Is the agent in a position to act to increase its own welfare at the expense of the principal?

c. Is the agent's action exposed to moral hazard? Please explain why or why not.

d. If your answer to part (c) is "yes," what actions may the Commission take to reduce the moral hazard?

PSC-241

Regarding: Market structure
Witness: Power

a. Is the wholesale electricity market in the Northwest sufficiently competitive such that, absent any involvement by electric utilities, their regulators, and publicly-owned utilities (*e.g.*, ratepayer-backed construction of new resources or commitments to long-term PPAs with non-utility generators), unregulated entrepreneurs would construct the capital-intensive resources needed to satisfy demand in the timeframe needed to maintain current standards of system reliability? If so, what evidence supports that conclusion?

b. If the wholesale electricity market in the Northwest is not competitive to the degree described in part (a), is it reasonable to assume that the region could not sustain current standards of system reliability if all the publicly-owned and regulated investor-owned utilities undertook a strategy of relying solely on purchases from wholesale spot markets to provide all future resource needs?

c. If the wholesale electricity market in the Northwest is not competitive to the degree described in part (a), so that maintaining current standards of system reliability requires ratepayer-backed capital investments either directly by publicly-owned and regulated investor-owned utilities or through ratepayer-backed long-term PPA commitments, to the extent NWE were to undertake a strategy of relying solely on purchases from wholesale spot markets to provide all future resource needs, would it and its customers be free-riding on other utilities' ratepayer-backed capital investments?

d. Are you aware of other utilities that use the projected cost of wholesale spot market purchases as the only or primary measure of the cost-effectiveness of a potential capital investment in a new resource? If so, please identify those utilities and provide citations for the documentation of this practice.

PSC-242

Regarding: Avoided cost benchmark
Witness: Power

a. At 21:18-22 you state that comparing the hydro purchase to continued over-reliance on the regional electric market is not a comparison with a reasonable alternative. Is this another way of saying that a projection of wholesale spot market prices is not a reasonable avoided cost benchmark against which to evaluate the cost of purchasing the hydros?

b. Is it important, economically, for the Commission to apply consistent measures of avoided costs when implementing the Public Utility Regulatory Policies Act of 1978

(PURPA), *i.e.*, setting rates for qualifying facilities, and evaluating resources NWE proposes for preapproval? Please explain why or why not.

c. In recent PURPA qualifying facility rate cases the Commission has measured NWE's avoided costs by blending near-term projections of wholesale market prices and the fixed and variable costs of owning and operating a combined cycle gas generating plant. Is the Commission's approach to measuring avoided costs in PURPA qualifying facility rate cases generally consistent with your analysis on pp. 15-23, as it regards the cost of alternatives to purchasing the hydros?

d. At 23:12-17 you indicate that a market-only-no-carbon-cost scenario involves significant risks, in part because it assumes regional electric and natural gas prices will stay relatively low. To the extent regional electric and natural gas prices impact the measure of costs that would be avoided by the hydro purchase, would it be reasonable for the Commission to consider alternatives to NWE's projections, for example natural gas price forecasts from the Energy Information Administration or the Northwest Power and Conservation Council? If not, please explain.

PSC-243

Regarding: Risks Associated With Aging Infrastructure
Witness: Power

You testify that "NWE appropriately included in its economic comparison of the hydro resource with alternative electric resource portfolios the other risks associated with each portfolio including uncertainty about future electric prices, natural gas prices, weather, customer loads, and coal prices." (3:5-8). Do you believe that NorthWestern adequately addressed, in its projections of capital improvement needs and costs for the hydro facilities, the potential range of risks associated with keeping a decades-old infrastructure operational, efficient, and safe? Please explain.

PSC-244

Regarding: Capital Expenditure Uncertainty
Witness: Power

a. In his discussion about NorthWestern's stochastic analysis, Dr. John Wilson, a witness for the Montana Consumer Counsel, states that "… NWE makes substantial cost-increasing adjustments for uncertainties regarding purchased power alternatives, but fails to recognize and account for certain substantial future hydro plant cost uncertainties, such as capital expenditure requirements, which are potentially far greater." (Wilson 23:17-24:1) Do you agree that NorthWestern failed to recognize and account for future hydro plant cost uncertainties?

b. Do you agree with Dr. Wilson's statement that uncertainties related to capital expenditure requirements are potentially greater than uncertainties related to purchased power alternatives? Please explain.

PSC-245

Regarding: Regulation of Carbon Dioxide
Witness: Power

a. When you use the term "developing regulation of carbon emissions" (2:5-6), what regulation precisely are you referring to?

b. Are you aware of other regulations now "developing" that would affect carbon pricing for electric generating units in Montana other than the new-source and existing-source performance standards for greenhouse gas emissions being developed by the EPA under Sections 111(b) and 111(d) of the Clean Air Act? If so, please identify other regulations and describe their impact on carbon price.

c. When you state that NorthWestern has "appropriately accounted" for carbon risk (2:5), do you mean that the carbon prices NorthWestern used in its deterministic and stochastic modeling are an appropriate proxy and expected result for the regulations mentioned in subpart (b) of this question? If so, how can you be sure that as yet unwritten regulations such as the 111(d) regulation of greenhouse gases will result in particular prices as presented by NorthWestern?

PSC-246

Regarding: Source Documents on Carbon Pricing
Witness: Power

a. Please provide the "2013 Carbon Dioxide Price Forecast" published by Synapse Energy Economics, Inc., referred to on 6:11-12.

b. Please provide a full copy of the "Carbon Disclosure Project-North America, December 2013" paper or document used to source the table appearing on page 7 of your testimony.

PSC-247

Regarding: Carbon Price Projection
Witness: Power

a. On p. 7 you provide a table of private companies that are projecting carbon prices for internal use. It appears that Exxon Mobil has projected a price of $60 and Royal Dutch Shell has projected a price of $40. Do you believe it is likely that either of these companies would invest significant capital based upon these figures, without

offsetting hedges in place to protect the company in the event that high carbon taxes did not occur?

b. The projected prices in the table range from $6 (Microsoft) to $60 (Exxon Mobil). ConocoPhillips apparently uses estimates ranging from $8 to $46. In your opinion, what is the cause of this variability in prices? Is it related to a paucity of historical carbon price events?

c. The four highest prices shown in the table are estimates from companies with significant investment in petroleum and its derivatives (BP, Conoco, Exxon, and Shell). Do you believe that these high price projections will inspire these companies to exit the fossil fuels market in anticipation of cratering profits due to carbon taxes?

PSC-248

Regarding: Realization of Carbon Cost in Purchase & Market Prices
Witness: Power

a. With respect to the charts showing other utilities' expectations of carbon price represented on pages 10 and 11 of your testimony, are you aware of whether any of these companies have been in an analogous position to NorthWestern (i.e., purchasing an existing asset whose production is expected to have a greater, or lesser, value in the future because of a future carbon price) and did what NorthWestern is proposing (i.e., capitalizing the expected future value of avoided carbon costs)? If so, please list those companies and describe the analogous situation.

b. For any companies listed in response to part (a), please identify those that captured that future value in present markets, from present consumers, even though the future value of avoided carbon costs had not yet been priced into the market.

c. Do the forward market curves used by NorthWestern include a carbon price that is internalized within the price offered to and taken by purchasers?

PSC-249

Regarding: Representation of Other Utilities' Carbon Forecasts
Witness: Power

a. You write "[o]f the 13 Western electric utilities used by NorthWestern for comparison purposes, only Tacoma Power *projected* lower mean carbon prices." (9:17-18) [emphasis added]. Elsewhere, you observe that NorthWestern eliminated certain forecasts that these other utilities used from the mean value that NorthWestern presents, even when those forecasts were sometimes those utilities' "base" cases (12:27-13:4). Did these other utilities really "*project*" these mean carbon prices or did NorthWestern select certain parts of other utilities' data for its own projection?

b. Of the Western utilities carbon prices you re-work and present on p. 10, how many zero-cost cases did NorthWestern's analysis ignore? How many of these were "base" or "reference" cases? Please identify those utilities.

c. Of the utilities Synapse used in its analysis, which you re-present on p. 11, how many have zero-cost cases as their "base or "reference" case? Please identify those utilities.

d. How many of the utilities represented in Synapse's work used multiple scenarios? Please identify those utilities, as well as how many scenarios they used.

PSC-250

Regarding: Carbon Price Projection
Witness: Power

a. Many of the price curves shown on pp. 10-11 were projected by regulated investor owned or public utilities. In your opinion, are any of these utilities at risk of serious financial loss if their projected price levels and escalation rates are not realized?

b. In your opinion, would a regulated utility benefit from projected carbon prices that exceed realized carbon prices to the extent that the inflated carbon price projections justify investment in expensive resources that provide increased profit opportunities?

c. In your opinion, are the customers of a regulated utility better off, or worse off, if the utility makes unnecessary investments due to inflated carbon price projections?

d. In your opinion, are NorthWestern's carbon price projections exposed to moral hazard? If so, should the Commission discount NorthWestern's carbon price projections?

PSC-251

Regarding: Carbon Price Risk
Witness: Power

a. Have you estimated how much of NorthWestern's proposed $900 million purchase price for the hydro resources is value imputed from its expected cost of future carbon emissions? If so, please provide that amount along with any underlying work papers.

b. If your answer to part (a) is "no," do you agree with Dr. Wilson that about $247 million of the proposed purchase price of $900 million for the hydro resources is value imputed from expected increases in energy costs due to future carbon costs, based upon the Stimatz DCF model and carbon price curves?

c. If the Commission approves purchasing the hydro resources for $900 million, but the expected carbon costs do not occur and market costs are lower than NorthWestern

projected, do you believe customers will be negatively affected by the cost of the hydropower relative to market resources?

d. In your opinion, would a combined purchase of the hydro and coal-fired facilities provide a hedge against the uncertainty in carbon prices, if the same carbon price forecast was reflected in the initial purchase price of the coal assets?

PSC-252

Regarding: Carbon Taxes
Witness: Power

a. To the extent you know, what percentage of (1) Montanans and (2) Americans are skeptical of the idea that the nation needs to curtail carbon emissions?

b. To the extent you know, how would a typical lower-income Montana resident weigh the net value of near-term increases in their energy bills in order to offset potential increased market costs from carbon taxes in 2021 and beyond?

c. To the extent you know, how would a typical lower-income Montana resident weigh the net value of paying higher energy costs, now and into the future, in order to achieve economic and environmental benefits of avoided carbon emissions?

d. In your opinion, do carbon taxes impose immediate and measurable costs on ratepayers based primarily on projected future benefits that are difficult to quantify?

e. In your opinion, will many people oppose carbon taxes once they realize their energy bills will be impacted? Please describe the basis for your certainty in carbon regulation. (p. 8:7).

PSC-253

Regarding: Modeling Carbon Taxes
Witness: Power

At 26:13-14 you state: "Where there is not information on past variation, an assumed frequency distribution has to be developed."

a. Is the triangular distribution Ascend Analytics (Ascend) used to model carbon prices in PowerSimm an assumed distribution that fits this description?

b. It appears that the distribution is symmetric in each period, with the mode pegged to NorthWestern's carbon price forecast, a lower bound of zero, and an upper bound equaling twice the mode. Given this, what information does the distribution provide that is not contained in the carbon price forecast?

c. In your opinion, is a triangular distribution more plausible or useful in this case than a uniform distribution or a discrete distribution with positive point probabilities?

d. In your opinion, given that an extensive body of carbon price data does not exist, does stochastic modeling of carbon prices provide significant additional value compared to deterministic modeling of a range of potential carbon prices?

e. The PSC's consultant, Evergreen Economics, as well as multiple commenters to the 2013 Resource Procurement Plan (the Montana Consumer Counsel, the Montana Environmental Information Center) criticize NorthWestern for not including a full range of scenarios (e.g., low, medium, high) of values for carbon price. Do you agree with this criticism? Please explain.

PSC-254

Regarding: Modeling of Risk in PowerSimm
Witness: Power

At 27:8-30:20 you discuss how Ascend modeled risk in its PowerSimm model.

a. Was it proper for NorthWestern and Ascend to design the PowerSimm model to ignore the risks associated with the possibility of large and unanticipated capital expenditures that could be necessary to keep the dams operating?

b. Do you believe that river flows are effectively modeled using a 30 year history? Is there reason to assume that flows may depart from a 30 year model? Please explain what factors could influence river flows.

c. How did Ascend measure downside risk, i.e., the risk that locking in cost-of-service based rates for a very large asset like the Hydros might cause the consuming public's price of electricity to exceed the market price?

d. You list the risks modeled by Ascend at 30:6-8. Are there risks not included in this list and not modeled by Ascend? What are they?

PSC-255

Regarding: Value of the PowerSimm Model
Witness: Power

Should the Commission discount the value of the PowerSimm model for the purpose of evaluating whether preapproval of the Hydros acquisition is in the public interest, given that the Commission and intervening parties did not have access to the model for the purpose of checking the sensitivity of outcomes to alternative parameter and probability distribution specifications?

PSC-256

Regarding: Combined Cycle Combustion Turbine (CCCT) Comparison
Witness: Power

a. With respect to the chart appearing on page 19, did you make the same assumptions about CCCT capital costs and gas prices as NorthWestern did?

b. What would this analysis look like if the 2011 RPP inputs for CCCT capital costs were relied upon? Would CCCT look like a relatively better value?

c. Why is it appropriate to assume only scenarios that have carbon price escalating at 3 percent or greater (you depict 3, 5, 7 and 10% scenarios), despite the fact that other costs are escalated on an assumption of 2.5% throughout the Hydros' life?

d. Montana-Dakota Utilities, in its integrated resource plan, assumes co-ownership of a CCCT to achieve greater economies of scale. NorthWestern does not. Do you believe that NorthWestern's expectation, that it alone would bear the burden of building a 238 MW CCCT in 2018 (one of the first modeled portfolios), is a proper one?

PSC-257

Regarding: Using Market to Meet Customer Needs
Witness: Power

You write "Adding no additional generating resources to NorthWestern's current portfolio would require NorthWestern to go into the regional electric market for about half of the electric energy needed to serve customers' loads…That would expose customers to potentially volatile market electric rates for almost half of all the electricity that NorthWestern provides to its customers." (20:17-21)

a. These sentences describe the status quo, and the situation as it has been over the past several years, do they not?

b. Are long-term power purchase agreements volatile?

c. Has the seven-year contract under which NorthWestern is currently taking power from PPLM proved volatile?

d. Do you agree with Ascend that price spikes are typically followed by a reversion to a mean in market prices for electricity and natural gas?

e. In most other situations, even for necessary commodities like gasoline, consumers have to pay the prices the market delivers, volatile though they may be. Why would it be catastrophic to have electric consumers do the same for half of their supply, given that they are generally subject to price volatility for all commodities, all the time?

PSC-258

Regarding: Best Practices for Resource Planning
Witness: Power

a. Are you aware of any other examples of utilities who undertake the completion of a resource plan only after agreeing to purchase a very large resource?

b. Should the Commission be concerned that the typical purpose of a resource plan—to surface the best resources to acquire, before their acquisition—is seemingly not the purpose of the 2013 Resource Procurement Plan?

c. If the answer to sub-part (b) is yes, how should the Commission regard the reliability of evidence presented in the 2013 RPP?

PSC-259

Regarding: NWE's Bid for Thermal Assets
Witness: Power

You write, "…NWE's bid for ***all*** of PPLM's generating facilities was not a serious bid, but may have been necessary to get PPLM to look seriously at its bid for the hydroelectric facilities." (35:15-17, emphasis original). Does this mean the inputs to the NorthWestern DCF and LTRR analyses presented in response to PSC-003 and PSC-066 cannot be considered NorthWestern's firm judgment about the future liabilities, operating and cap-ex costs, and values associated with a *serious* analysis of the thermal assets? Please explain.

PSC-260

Regarding: PPLM's Thermal Facilities, Environmental Risk
Witness: Power

At 36:1-17 you describe two categories of cost risk concerns regarding PPLM's coal-fired electric generators; 1) future environmental compliance costs; and 2) market risk associated with excess generating capacity.

a. Regarding the first category, it appears that NorthWestern built expectations of future carbon costs into its valuation of the hydro facilities. In your opinion, would it be possible to build expected environmental costs into the valuation of the coal assets, and mitigate the first category of risk in that way?

b. In your opinion, is it theoretically and practically possible to find prices for the individual assets; Colstrip 1 and 2, Colstrip 3, and the Hydros; such that an otherwise unbiased observer would be indifferent to the choice of any one of them with respect to expected environmental compliance costs? If so, should the Commission discount the environmental cost concerns raised by NorthWestern? If not, why not?

c. In response to data request PSC-066, NorthWestern provided a spreadsheet that estimates the net present value of Colstrip 1 and 2 to be minus $127 million, and the net present value of Colstrip 3 to be plus $100 million. In your opinion, do these figures represent reasonable estimates of the value of these resources?

d. In your opinion, is a detailed valuation of the proffered coal-fired resources relevant to this proceeding? Please explain your reasoning.

PSC-261

Regarding: Hydroelectric Environmental Compliance Risks
Witness: Power

a. In your recollection, were the Libby and Dworshak dam projects unopposed on environmental grounds, or did they face significant opposition due to anticipated impacts on wildlife habitats, ecosystems, and other environmental structures?

b. Are environmental advocates now comfortable with large water projects and their effect on natural systems? Are these projects considered environmentally benign?

c. Elsewhere in the Northwest, there have been movements to remove dam structures and thus return a river to its natural or wild state. Do you believe that such a prospect is unrealistic in Montana with respect to these Hydros?

d. Assuming NorthWestern acquires PPLM's hydroelectric facilities, do you believe it appropriate to consider a measure of risk that it may incur significant unexpected environmental compliance costs, including dam removal and remediation?

e. How long do you believe the dams will remain functional for the purpose of generating electricity?

PSC-262

Regarding: Facility Siting and Electricity Generation Rights
Witness: Power

a. At JMS-16:1-4 Stimatz asserts that "…ownership of the Hydros includes the right to generate electricity at those locations. These rights are extremely valuable, particularly against a backdrop of increasing environmental regulation." In your opinion, is it appropriate to assume with certainty that these rights will continue to be extremely valuable? Would it be appropriate to consider a measure of risk that their value will diminish?

b. In your opinion, did the value of Montana Power's right to generate electricity at Kerr Dam change between 1970 and 1990? Did the value of its right to generate electricity at Milltown change between 1970 and 1999?

c. In your opinion, are there important economic differences in the value of the right to generate electricity at a hydroelectric location versus the right to generate electricity at a thermal plant site such as Colstrip? Can any differences be explained using traditional measures such as the expected cost of production, transmission capacity and cost of upgrades, market access, and expected salvage and remediation costs?

PSC-263

Regarding: PPLM's Thermal Facilities
Witness: Power

Regarding the market risk associated with excess generating capacity (36:7-17); can this risk be mitigated by reducing the probability that the total cost of producing electricity from the coal-fired assets (variable cost plus fixed cost or credit if purchase price is negative) exceeds the market price of electricity?

PSC-264

Regarding: PPLM's Thermal Facilities
Witness: Power

a. At 36:19-23 you describe NorthWestern's concern that FERC might impose additional regulation on the utility due to market power. Did FERC impose additional regulation on PPLM due to a presumption of market power?

b. Assuming that NorthWestern acquired all of PPLM's electric generators in Montana, and assuming that a significant fraction of the total capacity would be dedicated to NorthWestern's customers, is it plausible that FERC would presume that NorthWestern would have market power where PPLM did not?

PSC-265

Regarding: Risk of Co-Owning Thermal Assets
Witness: Power

You write "NWE also saw the fact that it would be just one of the owners of the Colstrip facilities, having to negotiate management decisions with a group of utilities as a negative feature of purchasing just a share of Colstrip 3." (36:25-27) Where does NorthWestern record this concern?

PSC-266

Regarding: Risk to Montana Coal from CSAPR
Witness: Power

You testify that the EPA's Cross-State Air Pollution Rule is likely to restrict the generation of electricity with coal. (38:18-21). Does that rule affect Montana-based generators? (If necessary, please refer to the EPA's CSAPR website: http://www.epa.gov/airtransport/CSAPR/)

PSC-267

Regarding: EIA Projections Concerning Coal
Witness: Power

You include an EIA forecast of expected generation from various resource types on page 41 of your testimony. You write, explaining the chart, "Actually, despite the fact that it seems likely that no or almost no new coal-fired electric generators will be built, the amount of electricity from coal-fired generation will increase modestly between 2012 and 2030 as the existing coal-fired generators are utilized to a greater extent." (41:7-10).

a. Do you expect that this statement applies to what one reasonably could expect to see from Colstrip Units 1, 2, 3 and 4? Explain.

b. You state that Powder River Basin coal "will continue to play an important role in the nation's and Montana's energy portfolio for several decades into the future." (44:8-10). Are you concluding that Colstrip and other Powder River Basin coal burners will thrive even if carbon is regulated?

c. Do you expect that the Commission's decision in this docket would have impact on the viability of the Colstrip assets?

d. Do the EIA projections you depict on page 41 assume a carbon price that influences the electric generating mix of the U.S. electricity supply?

PSC-268

Regarding: Commission Precedent on Paying Avoided Carbon Price to Generators
Witness: Power

Independent generators who take avoided-cost rates established by the Commission are not paid today for the future value of the carbon emissions they avoid. NorthWestern has argued against paying them for avoided carbon. (Wilson 18:15-19:12). The Commission has, in that instance, agreed with NorthWestern. Why should NorthWestern be treated differently than these generators?